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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
RUTTEN, JAMES D	

ART UNIT	PAPER NUMBER
2192	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/560,269	NOLTE, BARRY M.	
	Examiner	Art Unit	
	J. Derek Rutten	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-16,19-31 and 34-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-16,19-31 and 34-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Acknowledgement is made of Applicant's amendment dated 23 March 2005, responding to the 6 January 2005 Office action provided in the rejection of claims 1-45, wherein claims 1, 6, 12, 16, 21, 27, 31, 36, 42, and 44 have been amended, claims 2, 3, 17, 18, 32, and 33 have been canceled, and no new claims have been added. Claims 1, 4-16, 19-31, and 34-45 remain pending in the application and have been fully considered by the examiner.

Response to Arguments

2. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1 and 4-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The language of the claim raises a question as to whether the claim is directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. The method steps do not rely on any hardware that would provide tangible results.

5. Claims 16, 19-30, and 34-45 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The language of "computer readable

medium" or "computer arrangement" does not provide a definite tangible result. Although page 5 lines 14-19 attempt to provide examples of computer readable media, certain embodiments, e.g. a carrier wave signal, is not considered to be tangible.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 10-12, 16, 25-27, 31, and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over prior art of record U.S. Patent Number 6,314,558 to Angel et al. (hereinafter "Angel") in view of prior art of record "Compilers: Principles, Techniques, and Tools" by Aho et al. (hereinafter "Aho") further in view of US 5539907 A to Srivastava et al. (hereinafter "Srivastava").

In regard to claim 1, Angel discloses:

determining a set of probe locations in the application, (Column 3, lines 16-20), wherein the set of probe locations comprises a probe location pair that produces redundant information;

Angel does not disclose probe elimination or a call to/enter function pair, or the relationship of call to/enter function.

However, in an analogous environment, Aho teaches that redundant code can be reduced so that a calculation is performed only once. See page bottom of page 592.

> We can avoid recomputing the expression if we can use the previously computed value.

Also in an analogous environment, Srivastava teaches that a probe at the entrance of a function is sufficient to capture the behavior of function calls as opposed to having each calling routine duplicate the call. Srivastava then places the call at the entrance of a function to capture the behavior of the function. See column 10 line 63 – column 11 line 3:

> AddCallProc is similar at the procedure level. **The semantics of modifying the program before and after procedures and basic blocks are maintained even if there are multiple entry points and multiple exit points.** For example, if a procedure has multiple entry points, adding a call before the procedure will add the call for each entry point of the procedure, and will only call the analysis routine once, regardless of which entry point is selected during execution.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Aho's teaching of redundant code elimination with Srivastava's teaching of code instrumentation with Angel's probes. One of ordinary skill would have been motivated to avoid recomputing a previously computed value (Aho bottom of page 592).

In regard to Claim 10, Angel teaches using the instrumentation to collect information relating to the execution of the application (Column 32, lines 60-67).

In regard to Claim 11, it would have been obvious to analyze collected data in order to generate an application profile, optimize the code, or fix errors in the code.

Claim 12 is a method claim that contains limitations already addressed in the rejections of Claims 1, 2, 3, 10, and 11, and is rejected for the same reason as these Claims.

Claims 16 and 31 are medium and computer arrangement claims that correspond with method Claim 1, and Claims 16 and 31 are rejected for the same reasons as Claim 1, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 1.

Claims 25 and 40 are claims that directly correlate with claim 10 and are rejected for the same reasons as Claim 10.

Claims 26 and 41 are claims that directly correlate with claim 11 and are rejected for the same reasons as Claim 11.

Claims 27 and 42 are medium and computer arrangement claims that correspond with method Claim 12, and Claims 27 and 42 are rejected for the same reasons as Claim 12, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 12.

8. Claims 4, 6, 19, 21, 34, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Angel, Aho, and Srivastava as applied in the above rejection of claim 1,

and further in view of prior art of record U.S. Patent Number 6,332,213 to Grossman et al. (hereinafter "Grossman").

In regard to Claim 4, Angel does not teach identifying a first location within the application at which a function call directs execution of the application to a second location outside of a current module, and inserting a first probe before the first location and a second after the first location. Grossman, however, does teach a method of selecting portions of code in which to place instrumentation (Column 19, lines 1-3), said portions corresponding to "operations that cause program variables to become defined or undefined" (Column 19, lines 24-25). These operations are defined in the specification to include "a function call or a return from a function call" (Column 11, lines 52-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 1, further identifying a first location within the application at which a function call directs execution of the application to a second location outside of a current module, and inserting a first probe before the first location and a second after the first location, as taught by Grossman, since this allows information about what occurs and changes during a function call.

In regard to Claim 6, the above rejection of claim 1 is incorporated. Grossman teaches that it is desirable to place instrumentation code before and after function calls. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to insert a probe in a first location, where said first location is before a function is called and also to insert a probe in a second location, where said second location is at

the start of a function that the function call returns to after execution, in order to better instrument the program.

Claims 19 and 34 are medium and computer arrangement claims that correspond with method Claim 4, and Claims 19 and 34 are rejected for the same reasons as Claim 4, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 4.

Claims 21 and 36 are medium and computer arrangement claims that correspond with method Claim 6, and Claims 21 and 36 are rejected for the same reasons as Claim 6, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 6.

9. Claims 5, 7, 13, 14, 20, 22, 28, 29, 35, 37, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angel, Aho, Srivastava and Grossman as applied in the above rejection of claim 4, and further in view of prior art of record Whygodny (U.S. Patent Number 6,282,701), Miller (U.S. Patent Number 6,438,512) and O'Donnell (U.S. Patent Number 6,374,369).

In regard to Claim 5, Angel does not teach that the first probe is configured to collect an address of a first and second function in which the identified first and second

location is located, a first stack pointer, and a first time indicator, and the second probe is configured to collect the address of the second function, a second stack pointer, and a second time indicator. Whygodny, however, does teach a method of monitoring and analyzing a computer program using tracing, where the trace data collected comprises "function calls (including the assembly address of the called function)" and "function return values (including function address)" (Column 29, lines 6-9). Whygodny does not teach collecting a stack pointer or a time indicator. O'Donnell, however, does teach collecting starting and ending times before and after a function call (Column 1, lines 45-49). O'Donnell does not teach collecting a stack pointer. Miller, however, does teach monitoring a program's performance by periodically interrupting program flow, and calling a function that returns a stack (Column 3, lines 10-11). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 4, further configure two probes for monitoring program performance, both probes collecting the addresses of the calling and called function as taught by Whygodny, a stack pointer as taught by Miller, and a time indicator as taught by O'Donnell, since gathering as much data as possible aids in better program analysis.

In regard to Claim 7, Angel does not teach that the first probe is configured to collect an address of the calling function, an address of the called function, a first stack pointer, and a first time indicator, and the second probe is configured to collect the address of the called function, a second stack pointer, and a second time indicator. Whygodny, however, teaches a method of monitoring and analyzing a computer program

using tracing, where the trace data collected comprises "function calls (including the assembly address of the called function)" and "function return values (including function address)" (Column 29, lines 6-9). Whygodny does not teach collecting a stack pointer or a time indicator. O'Donnell, however, does teach collecting starting and ending times before and after a function call (Column 1, lines 45-49). O'Donnell does not teach collecting a stack pointer. Miller, however, does teach monitoring a program's performance by periodically interrupting program flow, and calling a function that returns a stack (Column 3, lines 10-11). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 6, and further configure two probes for monitoring program performance, both probes collecting the addresses of the calling and called function as taught by Whygodny, a stack pointer as taught by Miller, and a time indicator as taught by O'Donnell, since gathering as much data as possible aids in better program analysis.

In regard to claim 13, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claims 4 and 5.

In regard to claim 14, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claims 6 and 7.

Claims 20 and 35 are medium and computer arrangement claims that correspond with method Claim 5, and Claims 20 and 35 are rejected for the same reasons as Claim 5,

where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 5.

Claims 22 and 37 are medium and computer arrangement claims that correspond with method Claim 7, and Claims 22 and 37 are rejected for the same reasons as Claim 7, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 7.

Claims 28 and 43 are medium and computer arrangement claims that correspond with method Claim 13, and Claims 28 and 43 are rejected for the same reasons as Claim 13, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 13.

Claims 29 and 44 are medium and computer arrangement claims that correspond with method Claim 14, and Claims 28 and 43 are rejected for the same reasons as Claim 14, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 14.

10. Claims 8, 23, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angel, Aho, and Srivastava, and further in view of prior art of record Yellin (U.S. Patent Number 5,761,513).

In regard to Claim 8, Angel further shows placing instrumentation code in the presence of a 'throw' operation (Figure 18 and Column 25, lines 20-34). Angel does not show placing instrumentation code at the beginning and end of a block of code, where the block of code is where the application is directed to in the occurrence of an error. However, Yellin teaches that "an exception handler 100 is a procedure" and is "executed whenever the applicable exception gets thrown during execution" (Column 1, lines 15-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to place instrumentation code at the beginning and end of the exception handing function as taught by Angel, where the exception handling function is a block of code to which execution of an application is directed upon in the occurrence of an error, since this would allow for the collection of data during an exception.

Claims 23 and 38 are medium and computer arrangement claims that correspond with method Claim 8, and Claims 23 and 38 are rejected for the same reasons as Claim 8, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 8.

11. Claims 9, 15, 24, 30, 39, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angel, Aho, Srivastava and Yellin and further in view of Whygodny, Miller, and O'Donnell.

In regard to Claim 9, Angel does not teach that the first probe is configured to collect an address of the block of code, a first stack pointer, and a first time indicator, and the second probe is configured to collect the address of the block of code, a second stack pointer, and a second time indicator. Whygodny, however, does teach a method of monitoring and analyzing a computer program using tracing, where the trace data collected comprises "function calls (including the assembly address of the called function)" and "function return values (including function address)" (Column 29, lines 6-9). Whygodny does not teach collecting a stack pointer or a time indicator. O'Donnell, however, does teach collecting starting and ending times before and after a function call (Column 1, lines 45-49). O'Donnell does not teach collecting a stack pointer. Miller, however, does teach monitoring a program's performance by periodically interrupting program flow, and calling a function that returns a stack (Column 3, lines 10-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Claim 8, and further configure two probes for monitoring program performance, both probes collecting the addresses of the calling and called function as taught by Whygodny, a stack pointer as taught by Miller, and a time indicator as taught by O'Donnell, since gathering as much data as possible aids in better program analysis.

In regard to claim 15, the above rejection of claim 12 is incorporated. All further limitations have been addressed in the above rejection of claims 8 and 9.

Claims 24 and 39 are medium and computer arrangement claims that correspond with method Claim 9, and Claims 24 and 39 are rejected for the same reasons as Claim 9, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 9.

Claims 30 and 45 are medium and computer arrangement claims that correspond with method Claim 15, and Claims 30 and 45 are rejected for the same reasons as Claim 15, where Angel teaches a medium (Figure 2) and computer arrangement (Figure 1) to carry out the method of Claim 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Derek Rutten whose telephone number is (571) 272-3703. The examiner can normally be reached on T-F 6:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jdr

Chameli C. Das
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7/11/05